

SUPPORT FOR THE AMENDMENT

Claims 1-13, 17 and 20 are cancelled.

Support for the amendment to Claim 14 is found on page 5, lines 12-16, page 8, lines 8-11, and page 9, line 15, in the specification.

Claim 15 is amended to recite proper antecedent basis to Claim 14.

Claim 16 is amended to depend from Claim 15 and to use wording and structure consistent with U.S. patent law practice.

Claim 18 is amended to depend from Claim 16.

Claim 19 is amended to have proper antecedent basis in Claim 16 from which it depends.

Claim 24 is new and is supported on page 6, lines 6 -13, in the specification.

Claim 25 is new and is supported on page 9, lines 15-16, in the specification.

Claim 26 is new and is supported on page 9, lines 6-7, in the specification.

No new matter will be added to the above-identified application upon entry of this amendment.

Upon entry of this amendment, Claims 14-16 and 18-19 and 21-26 are active.

REQUEST FOR RECONSIDERATION

Applicants would like to thank Examiner Song for the helpful and courteous discussion held with their U.S. representatives on April 17, 2007. During the meeting Applicant's representative explained that the cited references fail to disclose or suggest a quartz glass crucible having a surface of a transparent coated layer comprising a crystallization promoter dispersed in a silica matrix such that the crystallization promoter is

in direct contact with the polysilicon contained in the crucible. The following remarks expand on the discussion with the Examiner.

Applicants note that Claim 14 is herein amended to recite the limitations:

“wherein, said crystallization promoter is a metal oxide derived from a metal organic acid salt or a metal carbonate of one or more metals selected from the group consisting of magnesium, calcium, strontium and barium; and
an amount of said crystallization promoter is equal to or more than 1×10^{-9} to less than 1×10^{-8} mol/cm² being calculated as metal oxide.”

The claimed invention relates to a quartz glass crucible for the process of pulling up silicon single crystal, wherein at least an inside surface of the crucible is coated with a silica matrix wherein a crystallization promoter is dispersed in the silica matrix and the crystallization promoter is a metal oxide in an amount as described above.

A quartz glass crucible having at least as an inside surface a silica matrix with a crystallization promoter in the amount of more than 1×10^{-9} to less than 1×10^{-8} mol/cm² is not disclosed or suggested by the cited references of record.

The rejection of Claims 14-16 and 18-23 under U.S.C. 103(a) over Hansen et al. (U.S. 5,980,629) in view of Watanabe et al. (U.S. 6,106,610) is respectfully traversed.

Hansen et al. describes a crucible having a body of vitreous silica with a cavity having a sidewall and bottom wall. A devitrification promoter is deposited on the inner surface of a sidewall and a second devitrification promoter is deposited on the outer surface of the sidewall. As the Examiner has stated, “Hansen et al. does not teach the crystallization promoter is dispersed in a silica matrix.”

Watanabe et al. is cited by the Office as teaching a crystallization promoter being used either alone or as a mixture with a powder of synthetic silicon dioxide to form a translucent quartz glass layer. The Examiner states that “this reads on applicant’s crystallization promoter dispersed in a silica matrix.”

Applicants respectfully submit that in the Hansen crucible, the amount of the crystallization promoter contained in the layer is in a range of 1×10^{-5} to 1×10^{-8} M/cm² (Claims 3 and 11). Hansen describes that if the amount of crystallization promoter is less than this amount, the effect is too small (Col. 3, line 6).

In contrast, Applicants have demonstrated in Examples 1-3 of the specification where the amounts of BaO are 3.9×10^{-9} , 5.2×10^{-9} and 6.5×10^{-9} M/cm² respectively, excellent results are obtained. Applicants note that the M/cm² values herein indicated are determined by mathematical conversion of the adhesion amounts of BaO in Table 2 of 0.6, 0.8 and 1 $\mu\text{g}/\text{cm}^2$ using a molar weight of 153.3 g/M. Applicants have described the improved properties of the invention resulting from the surface modified layer on page 4, lines 8-23, in the specification. Such results would not be expected based on the teaching of Hansen.

Moreover, Applicants respectfully point out that Wanabe further describes the formation of a internal layer of silicon dioxide covering the crystallization promoter-containing layer (Col.5, lines27-35). This inner layer prevents direct contact of the crystallization promoter with the polysilicon as indicated by the following statement in Col. 6, lines 28-33:

“Thus, because the impurity which functions as a crystallization promoter is not brought into direct contact with the silicon melt, the incorporation of an impurity into the silicon single crystal can be prevented from occurring.”

Applicants respectfully submit that based on this statement Watanabe et al. teaches away from a crucible having an inner surface wherein a crystallization promoter can be in direct contact with the polysilicon.

In contrast, Hansen et al. describes “a first devitrification promoter being on the inner surface of the sidewall formation” (Claim 1).

MPEP § 2145 (X.D.2.) states:

“It is improper to combine references where the references teach away from their combination.”

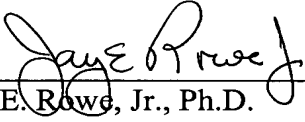
Therefore Applicants respectfully submit that because Watanabe et al. teaches a surface where the crystallization promoter cannot be in direct contact with the polysilicon and Hansen et al. requires such contact the cited prior art references should not be combined.

Based on the arguments presented above, Applicants respectfully submit that the combined teaching of Hansen and Watanabe neither disclose nor suggest the crucible of the claimed invention. Furthermore, Applicants respectfully argue that the combination of the two references is not proper and withdrawal of the rejection of Claims 14-16 and 18-23 under U.S.C. 103(a) over Hansen et al. (U.S.5,980,629) in view of Watanabe et al. (U.S. 6,106,610) is respectfully requested.

Applicants respectfully submit that the above-identified application is now in condition for allowance and early notice of such action is earnestly solicited.

Respectfully submitted,

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